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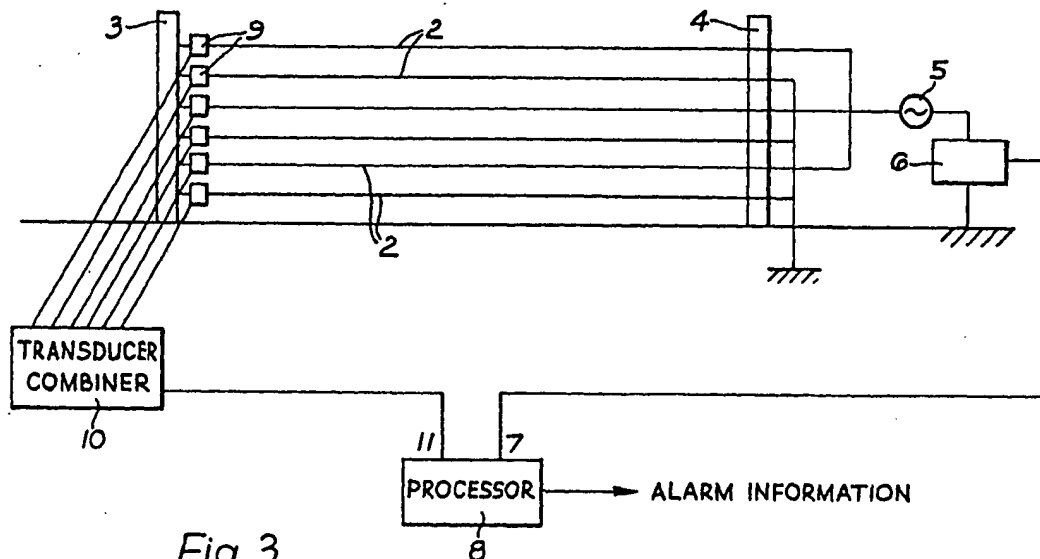
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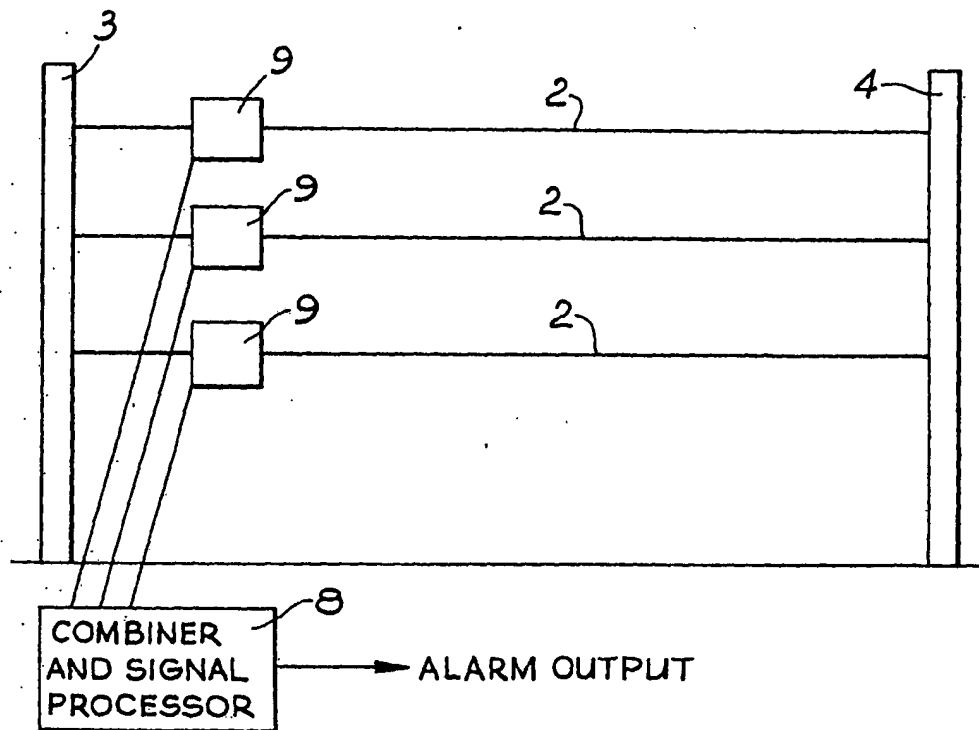
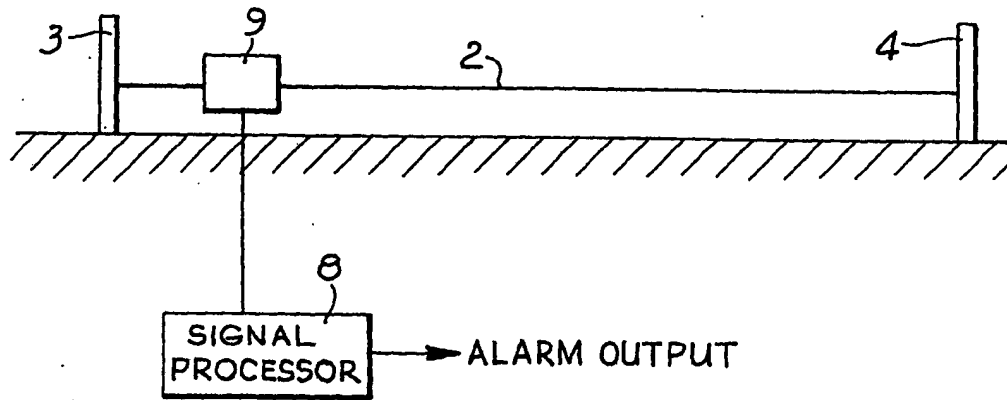
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(54) Intruder detection barrier

(57) Physical encroachment on tensioned wire 2, which may be a trip wire, causes a change in tension which is sensed by the analogue output of a strain gauge or pressure transducer 9 inserted in the wire 2. A low frequency voltage can also be imposed on the fence wires to provide a simultaneously operating capacitance proximity sensor.



The drawing(s) originally filed was/were informal and the print here reproduced is taken from a later filed formal copy.



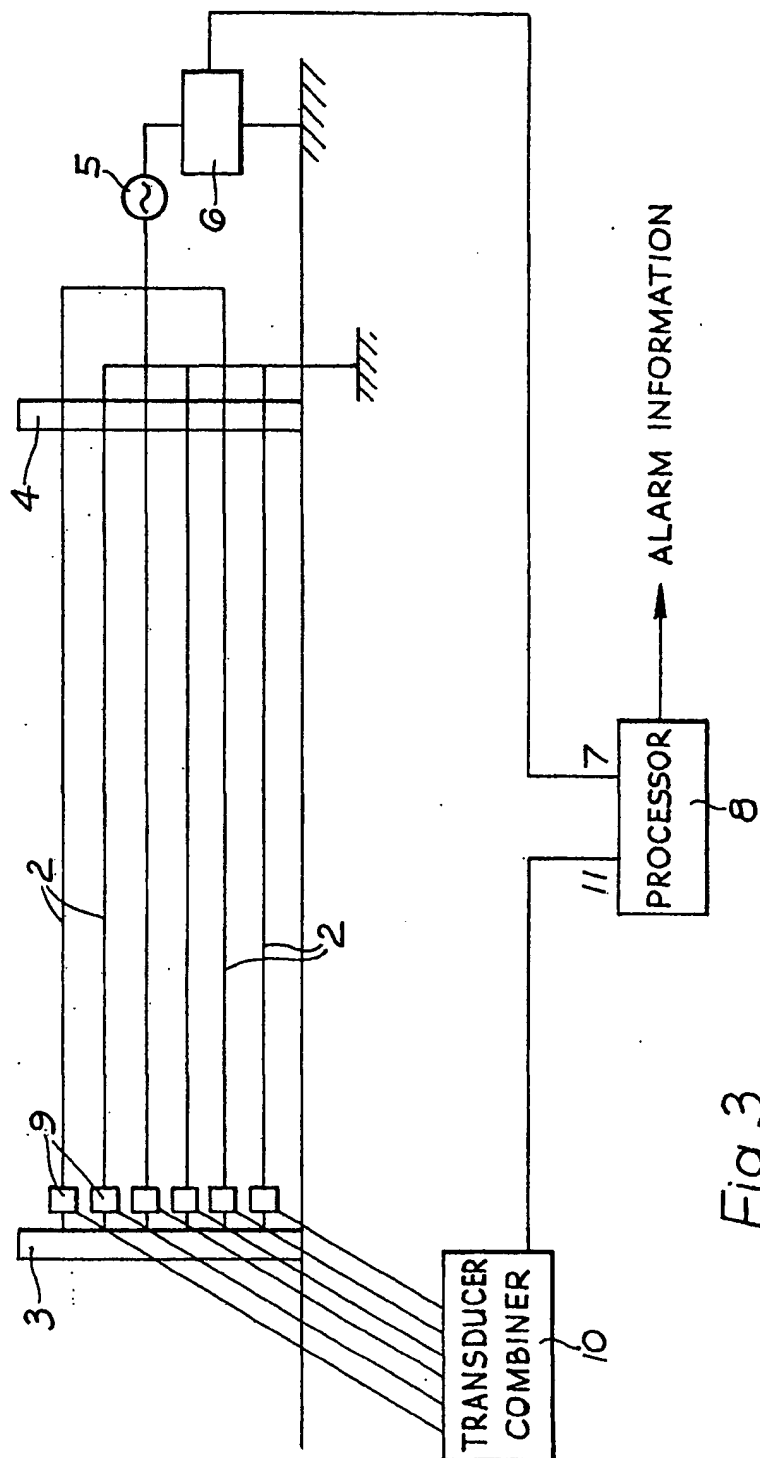


Fig. 3

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SPECIFICATION

Intruder detection barrier

- 5 This invention relates to an intruder detection barrier.

It is known to provide a tensioned thread (which may or may not be an electrical conductor) attached to a switch and so arranged that an increase or decrease in the tension of the thread beyond predetermined limits causes operation of the switch. Such a device suffers from the limitation that the switch has only two positions and can therefore only

- 15 indicate operation or non-operation.

It is an object of the present invention to provide an improved intruder detection barrier which will give more information about the nature or degree of any intrusion than any

- 20 known barrier.

According to the invention in its broadest sense, an intruder detection barrier comprises a tensioned thread or wire to which a strain gauge or pressure transducer is attached and detector means connected to the strain gauge or pressure transducer such that a change in tension of the thread or wire occurring upon physical encroachment on the barrier by an intruder is detected as an analogue output

- 30 signal from the strain gauge or pressure transducer.

The analogue output signal is obviously proportional to the change in tension of the wire or thread.

- 35 The simplest embodiment of the invention consists of a single thread or wire attached to a strain gauge and employed as a trip wire.

A more sophisticated embodiment of the intruder detection barrier of the invention comprises a vertical fence formed of a plurality of tensioned threads or wires extending generally parallel to each other, each thread or wire being connected to a respective strain gauge. The respective gauges are connected to a combiner unit and signals from the respective gauges are processed by the combiner unit to determine whether the signals are indicative of an attempted intrusion.

- 40 It is known to apply a low frequency voltage to parallel threads or wires forming an intruder detection fence so that when an intruder touches one or more of the wires, a capacitance change occurs in the balanced electrical system, which change can be readily

- 55 detected.
- In accordance with a development of the present invention an intruder detection barrier may advantageously comprise a plurality of tensioned wires extending generally parallel to each other to each of which a low frequency voltage is applied and in each of which a respective strain gauge or pressure transducer is also inserted so that, upon physical encroachment on the barrier by an intruder, two

- 65 types of signal may be derived from the

barrier, relative to the change in electrical capacity and the change in tension of the wires respectively.

- 70 The two types of signal may then be applied to a signal processor which generates alarm information indicating the nature or degree of the intrusion.

- The invention will be described further with reference to the accompanying drawings it being understood that the following is merely illustrative and not limitative of the scope of the invention. In the drawings:

- 80 *Figure 1* is a diagrammatic sketch of a first embodiment of the intruder detection barrier of the invention.

Figure 2 is a diagrammatic sketch of a second embodiment of the invention; and

Figure 3 is a diagrammatic sketch of a third embodiment of the invention.

- 85 The same reference numerals are used throughout to indicate similar parts.

Fig. 1 shows an intrusion detection barrier in the form of a trip wire consisting of a single wire 2 extending between two short posts 3, 4. A strain gauge 9 is inserted into the wire 2 adjacent the post 3 and this gauge 9 is connected to a signal processor. The strain gauge 9 provides to the signal processor 8 an analogue signal which is proportional to any change in the tension of the wire 2 from an initial preset tension. The signal processor determines whether the signal received is indicative of an attempted intrusion if so gives rise to an alarm output, as indicated.

- 100 *Fig. 2* illustrates a more sophisticated embodiment in which the intrusion detection barrier is in the form of a fence consisting of a plurality of parallel wires 2 extending between posts 3, 4. A strain gauge 9 is inserted in each wire and the gauges are all connected to and provide analogue output signals to a combiner/signal processor unit 8, which combines the various inputs to determine whether an intrusion is occurring at any particular

- 110 time.
- Fig. 3* also shows an intrusion detection barrier in the form of a fence consisting of a plurality of wires 2 extending horizontally and generally parallel to each other between two fence posts 3, 4. In this case, a low frequency voltage, typically a few volts at 30KHz, is applied to each of the wires 2 by voltage supply means, such as an oscillator 5 located on or adjacent to the fence post 4. When an intruder touches one or more of the wires 2, a capacitance change occurs in the balanced electrical system. By way of differential amplifiers, band pass filters and a combiner unit, all indicated generally at 6, this capacitance change gives rise to a first signal 7 which is fed into a signal processor 8.

- 125 Adjacent the fence post 3, a respective pressure transducer or strain gauge 9 is inserted into each of the wires 2. When an intruder physically moves one or more of the

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wires 2 this changes the tension of those wires 2, which change is detected by the relevant transducer or transducers 9 and thus by a transducer combiner unit 10 which gives rise to a second signal 11 which is fed into the signal processor 8:

The signal processor 8 combines the information from the first signal 7 and the second signal 11 and is able thus to provide useful alarm information to the user regarding the nature and degree of intrusion.

It will be appreciated that in practice the sections of fence illustrated in the sketches will be extended to provide a perimeter fence surrounding the area to be protected against intrusion.

CLAIMS

1. An intruder detection barrier comprising a tensioned thread or wire to which a strain gauge or pressure transducer is attached and detector means connected to the strain gauge or pressure transducer such that a change in tension of the thread or wire occurring upon physical encroachment on the barrier by an intruder is detected as an analogue output signal from the strain gauge or pressure transducer.

2. An intruder detection barrier comprising a vertical fence formed of a plurality of threads or wires extending generally parallel to each other, each thread or wire being connected to a respective strain gauge and the respective gauges being connected to a combiner unit so that signals from the respective gauges are processed by the combiner unit to determine whether the signals are indicative of an attempted intrusion.

3. An intruder detection barrier comprising a plurality of tensioned wires extending generally parallel to each other to each of which a low frequency voltage is applied and in each of which a respective strain gauge or pressure transducer is also inserted so that, upon physical encroachment on the barrier by an intruder, two types of signal are derived from the barrier, relative to the change in electrical capacity and the change in tension of the wires respectively.

4. An intruder detection barrier as claimed in claim 3 wherein the two types of signal are applied to a signal processor which generates alarm information indicating the nature or degree of the intrusion.

5. An intruder detection barrier substantially as hereintofore described with reference to and as illustrated by Fig. 1, or Fig. 2, or Fig. 3 of the accompanying drawings.

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